

[10191/4536]  
IAP20 Rec'd PCT APTO 23 FEB 2006SHEATHED-ELEMENT GLOW PLUG HAVING A PARTICULARLY EMBEDDED  
CONTACT ELEMENT

The present invention relates to a sheathed-element glow plug for an internal combustion engine made up of a plug housing, a connection part for the electrical current which is situated on the plug housing as well as a sheathed-element heater,

5 which is usually in the form of a tube including an embedded heating element. The connecting part and the heating element are electrically coupled by a terminal pin and a contact element.

## Background Information

10 The contact element together with the terminal pin and the connection area of the sheathed-element heater in the housing interior forms the positive contact. Various methods are known from the related art for securing the contact element within the housing of the sheathed-element glow plug and insulating

15 it from the housing.

The present invention relates in particular to embodiments in which the contact is produced by an elastic conduction element such as a graphite tablet. Ceramic clamping sleeves are used in these embodiments for insulation and fixation. These

20 sleeves surround the terminal pin and the graphite tablet and thus prevent contact with the housing. Simultaneously, they keep the contact element in a defined position, thus ensuring a good contact with the sheathed-element heater, i.e., the heating element.

## Disadvantages of the Related Art

Frequently sheathed-element glow plugs having a small diameter are requested. Since the electrical properties are predetermined by the sheathed-element heater and the terminal pins, or their dimensions are predetermined, little space remains between the terminal pin and housing. The clamping sleeves must therefore be made using a thin wall, which in the case of ceramic materials is associated with high manufacturing complexity and costs.

## 10 Object of the Invention

The object of the present invention is to provide a sheathed-element glow plug having a solidly secured contact element, it being possible to secure and insulate the contact element cost-effectively.

## 15 Achieving the Object

The object is achieved by surrounding the terminal pin and the contact element at least partially by an electrically insulating plastic sleeve within the housing.

## Advantages of the Invention

20 The use of a sleeve, preferably a plastic clamping sleeve, produces a very simple insulation from the housing. In contrast to ceramic sleeves, plastic sleeves have the advantage that it is possible to manufacture them more simply and accordingly more cost-effectively. This applies in  
25 particular to sleeves having thin walls as is frequently needed in sheathed-element glow plugs.

Even with thin walls, plastics are capable of producing a good insulation and are simultaneously robust enough to be able to withstand additional processing steps. If, for example, a

supporting tube surrounding the housing is bonded to the housing, which may be accomplished by pressing, swaging, soldering or welding, often strong forces also act on the plastic sleeve.

- 5 Plastic sleeves may be easily manufactured in various sizes and shapes. An advantageous embodiment is to manufacture the plastic sleeve as a clamping sleeve.

To produce a good contact, the largest possible surfaces of the contact element must be coupled to the heating element and  
10 the terminal pins. For that reason, a cylindrical shape of the contact element is provided for a tubular component such as the sheathed-element glow plug. In order to ensure adequate insulation from the housing, the plastic sleeve must therefore completely surround the cylinder sheathing.

- 15 In contrast to ceramic materials, plastics having elastic properties may also be provided. In one advantageous embodiment, the plastic sleeve has elasticity in the radial and/or longitudinal direction. The elasticity increases the robustness of the component and reduces the probability of  
20 fracture during assembly or under loads during operation.

The plastic sleeve may be of one piece or, in another advantageous embodiment, it may also be formed from a plurality of pieces. The individual parts may then be combined for sheathed-element glow plugs of different types using the  
25 principle of modularity.

Additional advantageous embodiments are found in the following description and the claims.

#### Drawing

- Figure 1 shows a schematic sectional representation of a  
30 part of a sheathed-element glow plug.

## Description of the Exemplary Embodiment

The parts of a sheathed-element glow plug 1 on which the present invention is based are shown in Figure 1. This sheathed-element glow plug 1 is made up of a plug housing 2 and a connection area 3 of a sheathed-element heater 4, which 5 is not shown in greater detail.

A terminal pin 5 is provided within housing 2. In order to produce the electrical contact between terminal pin 5 and connection area 3 of the heater, a contact element 6 is 10 provided between these two elements. This contact element is preferably elastic. A contact element 6 of this type may be, for example, a graphite tablet.

In order to secure contact element 6 and insulate the contact element and terminal pin 5 from housing 2, according to the 15 present invention, a plastic sleeve 7 is inserted into housing 2, terminal pin 4 being situated within the plastic sleeve. This plastic sleeve 7 having a thin wall 8 may be produced simply and cost-effectively.

A recess 9 is provided in connection area 3 into which contact 20 element 6 is at least partially insertable.

Sleeve 7 is preferably designed to be of one piece. It is designed as a clamping sleeve and is thus in contact with inside wall 10 of housing 2.